

Application No.: 09/776,385
Amendment dated February 17, 2004
Reply to Office action dated November 17, 2003

Docket No.: H0610.0026/P026

REMARKS

Claims 1, 9, 11, and 13 have been amended. Claims 5 and 10 have been cancelled. Claims 1-4, 6-9, and 11-17 remain pending in the present application.

Claim 9 stands objected to under 37 C.F.R. 1.75(c). Claim 9 has been amended to recite a further limitation of the structure of the apparatus of claim 1. In light of this amendment, Applicant submits that claim 9 is in proper form.

Claims 1, 4, 9, 12, and 13 stand rejected under 35 U.S.C. § 102(b) as being anticipated by WO 97/23007 (WO '007). Reconsideration is respectfully requested.

The abstract of WO'007 recites "a fuel cell which has a porous self-supporting layer and another layer with catalytic properties," wherein "the self-supporting layer has a thickness several times greater than that of the layer with the catalytic properties and consists of a *cermet* comprising Al_2O_3 TiO_2 to which Ni is admixed." (Emphasis added). WO'007 provides an interconnector 1, but makes no mention of the type of material the interconnector 1 consists of.

By contrast, the claimed invention uses *metallic materials and metal alloys* for its planar support material. Specifically, as recited in amended claim 1, the solid oxide fuel cell has, *inter alia*, "a planar support in form of a porous metal and/or metal alloy plate structure made from ferritic stainless steel, nickel-based alloys, and/or high chromium alloys, the plate structure in contact with and directly supporting . . . a layer of anode active material." The metallic materials and alloys of the present invention have high ductility or robustness, as compared to the cermet materials described in WO '007, which tend to be brittle. According to the present invention, the dense, ceramic layer 10 penetrates the surface pores of the support material to form a composite interphase structure. The two layers 2 and 10 form a multi-functional interconnect and support structure. (Specification, page 4, line 25 to page 5, line 28). Contrary to the assertion in the Office Action at page 4, the plate 6 of WO '007 is made of a *cermet* material that may contain nickel or

Application No.: 09/776,385
Amendment dated February 17, 2004
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Docket No.: H0610.0026/P026

chromium, but *not* a support plate that is made from ferritic stainless steel or nickel or chromium alloys. WO '007 does not disclose the use of ferritic stainless steel, nickel-based alloys, or high chromium alloys as support materials which can form a composite with a dense, ceramic layer.

Moreover, WO '007 structure includes the cermet anode support structure 6 between the anode 5 and the interconnector 1. In the present invention, the porous metal or metal alloy plate structure is "in contact with and directly supporting . . . a layer of anode active material." Therefore, amended independent claim 1 and its dependent claims 4, 9, 12, and 13 are submitted to be allowable over the prior art of record.

Claims 2, 3, and 11 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over WO '007 in view of either U.S. Patent No. 6,228,520 (Chiao) or EP 750798-A (EP '798). Reconsideration is respectfully requested.

Claims 2, 3, and 11 depend from claim 1. For at least the same reasoning set forth above regarding the patentability of claim 1 as not anticipated by WO '007, WO '007 would not have rendered its subject matter obvious. The disclosures of Chiao and EP '798 cannot supplement the inadequacies of WO '007 in this regard.

As noted in the Office Action at page 6, the disclosure of Chiao uses a lanthanum chromite layer 50 between the anode layer of one fuel cell and the cathode layer of an adjacent cell, providing an excellent barrier to gases and excellent conductivity. (Col. 2, lines 45-49; Fig. 1). However, Chiao does not teach or suggest the use of ferritic stainless steel, nickel-based alloys, and/or high chromium alloys in forming a planar support to supplement the disclosure of WO '007. Similarly, the Office Action at page 5 notes that EP '798 discloses a gas impermeable metallic interconnect disposed between adjacent cells, but is also silent on the use of metallic materials and metal alloys in forming the support layer as in the present invention. Therefore, claims 2, 3, and 11 are submitted to be allowable over the prior art of record.

Docket No.: H0610.0026/P026

Application No.: 09/776,385
Amendment dated February 17, 2004
Reply to Office action dated November 17, 2003

Claims 6 and 14 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over WO '007 in view of Buchkremer et al. "Advances in the anode supported planar SOFC technology" (Buchkremer). Reconsideration is respectfully requested.

Claims 6 and 14 depend from claim 1. For at least the same reasoning set forth above regarding the patentability of claim 1 as not anticipated by WO '007, WO '007 would not have rendered its subject matter obvious. The disclosure of Buchkremer cannot supplement the inadequacies of WO '007 in this regard.

The Office Action uses Buchkremer to modify the teachings of WO '007 by using a gas impermeable rim on the anode substrate to seal the anode substrate and prevent fuel from escaping. However, Buchkremer, like WO '007 is silent on the use of ferritic stainless steel, nickel-based alloys, and/or high chromium alloys in forming a planar support, as taught in the present invention. Therefore claims 6 and 14 are submitted to be allowable over the prior art of record.

Claims 6, 7, 14, and 15 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over WO '007 in view of U.S. Patent No. 5,589,286 (Iwata). Reconsideration is respectfully requested.

Claims 6, 7, 14, and 15 depend from claim 1. For at least the same reasoning set forth above regarding the patentability of claim 1 as not anticipated by WO '007, WO '007 would not have rendered its subject matter obvious. The disclosure of Iwata cannot supplement the inadequacies of WO '007 in this regard. Iwata, like WO '007, is silent on the use of ferritic stainless steel, nickel-based alloys, and/or high chromium alloys in forming a planar support, as taught in the present invention. Therefore claims 6, 7, 14, and 15 are submitted to be allowable over the prior art of record.

Claim 8 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over WO '007 in view of U.S. Patent No. 5,998,056 (Divisek). Reconsideration is respectfully requested.

Application No.: 09/776,385
Amendment dated February 17, 2004
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Docket No.: H0610.0026/P026

Claim 8 depends from claim 1. For at least the same reasoning set forth above regarding the patentability of claim 1 as not anticipated by WO '007, WO '007 would not have rendered its subject matter obvious. The disclosure of Divisek cannot supplement the inadequacies of WO '007 in this regard. Divisek, like WO '007, is silent on the use of ferritic stainless steel, nickel-based alloys, and/or high chromium alloys in forming a planar support, as taught in the present invention. Therefore claim 8 is submitted to be allowable over the prior art of record.

Claim 16 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over WO '007 in view of Divisek and in further view of Iwata. Reconsideration is respectfully requested.

Claim 16 depends from claim 1. For at least the same reasoning set forth above regarding the patentability of claim 1 over WO '007 in view of Divisek and WO '007 in view of Iwata, the combination of Divisek and Iwata with WO '007 likewise does not render its subject matter obvious. None of WO '007, Divisek, and Iwata mention the use of ferritic stainless steel, nickel-based alloys, and/or high chromium alloys in forming a planar support, as taught in the present invention. Therefore claim 16 is submitted to be allowable over the prior art of record.

Claim 17 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over WO '007 in view of either Chiao or EP '798, and in further view of Divisek. Reconsideration is respectfully requested.

Claim 17 depends from claim 1. For at least the same reasoning set forth above regarding the patentability of claim 1 over WO '007 in view of Chiao or EP '798 and WO '007 in view of Divisek, the combination of these references likewise does not render its subject matter obvious. None of WO '007, Chiao, EP '798, and Divisek mention the use of ferritic stainless steel, nickel-based alloys, and/or high chromium alloys in forming a planar support, as taught in the present invention. Therefore claim 17 is submitted to be allowable over the prior art of record.

Docket No.: H0610.0026/P026

Application No.: 09/776,385
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In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to pass this application to issue.

Dated: February 17, 2004

Respectfully submitted,

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